

I claim:

1. A body fluid diagnostic device comprising:

a. a handle;

5 b. a test head attached to the handle, said test head having a test channel which is positioned in a recess in a surface of the test head and said test channel being comprising of a base and opposing upper and lower channel walls which extend from the base and are spaced apart from each other for forming a test channel opening and said test channel being capable of retaining a test sample of body fluid by capillary force;

10 c. sensing means in communication with the test channel for providing an output sensing signal representative of the tested properties of body fluid collected in said test channel;

d. signal processing means for converting the output sensing signal to readable or storable information, said signal processing means having an input means for
15 receiving the output sensing signal and an output means for producing a signal for information display or storage; and

e. a power source attached to said handle for energizing the sensing means and the signal processing means.

2. The body fluid diagnostic device of claim 1 wherein the signal processing
20 means is a microprocessor.

3. The body fluid diagnostic device of claim 1 wherein the sensing means is comprised of one or more sensor.

4. The body fluid diagnostic device of claim 1 including a reservoir for storing a reagent and a dispensing means for delivering a quantity of a reagent from the reservoir into the test channel.

5. The body fluid diagnostic device of claim 1 including two reservoirs for storing functional fluids and a dispensing means for delivering said functional fluids from said reservoirs into the test channel.

6. The body fluid diagnostic device of claim 4 wherein the dispensing means includes a resilient elastic button for applying pressure to force the flow of reagent from the reservoir to the test channel.

10 7. The body fluid diagnostic device of claim 5 wherein the dispensing means includes two elastic buttons and an disk actuator, said disk actuator contacting the said elastic buttons selectively for dispensing at least one functional fluid.

15 8. The body fluid diagnostic device of claim 6 wherein said dispensing means includes an elastic membrane valve, said elastic membrane valve having flexible valve segments separated by cross-cut slits with slit clearance sufficiently small for liquid-proof sealing of the dispensing opening when said elastic membrane valve being in the closed position.

9. The body fluid diagnostic device of claim 4 wherein the reservoir includes a replaceable cartridge containing a reagent.

20 10. The body fluid diagnostic device of claim 1 wherein the sensing means includes at least one electrode system having a plurality of electrodes and counter electrodes, said electrode system being positioned on at least one wall of the test channel.

11. The body fluid diagnostic device of claim 1 wherein:

a. the sensing means is comprised of a renewable biosensor system which includes at least one reusable electrode system having a plurality of electrodes and counter electrodes, said electrode system being positioned on at least one wall of the test channel; and

5 b. the test channel has an opening in one wall of said test channel for the inlet flow of a controlled quantity of reagent into the test channel for forming a mixture with body fluid, said mixture being removable from the electrode system and from the test channel by a treatment liquid.

12. The body fluid diagnostic device of claim 1 wherein the sensing means is
10 comprised of a fiber optic sensor positioned in a test channel wall.

13. The body fluid diagnostic device of claim 1 including a filter to vent air from the test channel, said filter being gas permeable and liquid impermeable and being positioned in a channel wall of the test channel.

14. The body fluid diagnostic device of claim 1 including a channel cover for
15 the test channel opening and said channel cover being slidable to its closed and open positions.

15. The body fluid diagnostic device of claim 1 including a driving means for imparting a vibrating motion to the test head.

16. The body fluid diagnostic device of claim 14 wherein the channel cover
20 comprises:

a. a saddle-shaped base with an opening which coincides with the channel opening when the channel cover is in an open position; and

b. guide ribs on the underside of the saddle-shaped base for engaging with slots in the edge surface of the test head and for guiding the sliding movement of the channel cover to its open and closed positions when said guide ribs are engaged in said slots.

5 17. The body fluid diagnostic device of claim 16 wherein the movement of the channel cover is actuated by a solenoid contained in the handle.

18. The body fluid diagnostic device of claim 14 wherein the movement of the channel cover is in response to the dispensing action of a reagent from a reservoir into the test channel.

10 19. The body fluid diagnostic device of claim 1 wherein a spout opening is positioned in the distal top end of said test head.

20. The body fluid diagnostic device of claim 1 including a reservoir for storing a functional viscous fluid in said handle and a means for pumping the said viscous fluid from the reservoir to the spout opening.

15 21. The body fluid diagnostic device of claim 20 including a reservoir for storing a pressurized-foaming material in said handle and a means for dispensing the said pressurized-foam material from the reservoir to the spout opening.

22. A handheld diagnostic device comprising:

- 20 a. a handle;
- b. a test head having a sensing surface and a reflective fiber optical sensor positioned on the sensing surface, said test head being attached to the handle;
- c. a test channel formed by a gap between a detachable channel

wall and the sensing surface of said test head, said detachable channel wall having a reflective surface opposing to said sensing surface for reflecting the light beam emitting from the fiber optical sensor, and said test channel being capable of collecting and retaining a fluid sample by capillary force;

5 d. a signal processing means for converting the output sensing signal of the fiber optical sensor as representative of the tested properties of the fluid sample to readable or storable information, said signal processing means having an input means for receiving the output sensing signal and an output means for producing a signal for information display or storage; and

10 e. a power source attached to said handle for energizing the sensing means and the signal processing means.

23. A handheld diagnostic device comprising:

 a. a handle;

 b. a test head attached to the handle having a sensing surface and an
15 electrode system, said electrode system having a plurality of electrodes and opposing counter electrodes positioned on said sensing surface and being spaced apart for forming a gap comprising a test channel between opposing measuring surfaces of said electrodes and counter electrodes whose other non-measuring surfaces being covered with insulating layer, and said test channel being capable of collecting and retaining a test sample by
20 capillary force;

 c. a signal processing means for converting the output sensing signal of the electrode system as representative of the tested properties of the fluid sample to readable or storable information, said signal processing means having an input means for

receiving the output sensing signal and an output means for producing a signal for information display or storage; and

d. a power source attached to said handle for energizing the sensing means and the signal processing means.